Chapter 3
Applying Blockchain Technologies in Healthcare: A Scientometric Analysis

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ABSTRACT

Recently, one of the inventive developments penetrating many industries is blockchain technology. In the era of globalization and digitalization, blockchain has garnered interest in various application fields from health data management to clinical trials. In this study, we aimed to explore blockchain applications in healthcare with an explorative perspective with a scientometrics analysis. With this analysis, the trends and evolutionary relations between health and blockchain technology were examined via the queries in the Web of Science database. In the analysis, the author keyword co-occurrences were used for demonstrating concept relationships. To understand the new emerging study field, VosViewer was used for network visualizations and CiteSpace free java-based software was used for scientometrics analysis. As a result, it can be implied that the main focus areas of the studies on blockchain are solving payment systems, digital identity, and privacy and security issues in healthcare field.

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INTRODUCTION

When innovation in healthcare is considered, economic wealth and better public health appear as two of the most prominent topics. As the access to care improves and technological innovation brings new perspectives in the medical field, new driving forces such as public expectations, more strict food and drug security measures, improved traceability and précised medicine increase come to the stage. The demand-side drivers force the health system to transform classical approaches into innovative ways to confront these demands in a cost-effective, appropriate and compatible manner (Petre, 2017a).

From a holistic perspective, healthcare is a complex ecosystem which brings together different services such as promotion, diagnosis, treatment, and rehabilitation. All these services are provided by different parties e.g. hospital, clinics, public sector, private sector, pharmaceutical and medical equipment manufacturers, private/public insurance facilities. As a result, patient healthcare data are scattered and fragmented among different parties of the healthcare system which makes data exchange and collaboration between institutions hard in current healthcare systems. However, patients need to secure and share their data whenever and wherever it is necessary. Due to the importance and sensitive nature of health data, their management is cumbersome in this context (Pilkington, 2017; Dubovitskaya et al., 2017; Szewczyk, 2017).

In many countries, paternalistic government policies prevent individuals from having access to their own health data. Individuals do not have full control of their health record. Current centralized structures of Electronic Health Records (EHR) are subject to hacking, strict security regulations, and excessive overhead costs (Simic et al., 2017; Swan, 2015: 56; McFarlane et al, 2017).

On the other hand, there are advancements in ICT enable cost-effective, technology-based, personalized solutions in the healthcare industry. Wearable devices, e-health, m-health, telehealth are all launched as the use of ICT and ICT based-products such as sensors, internet of things (IoT), cloud systems, remote monitoring system have become financially feasible. Therefore, these developments help patients track their vitals and health parameters while accumulating data in enormous amounts. Patient data acquired by many different devices, providers, and systems cause privacy, security concerns as well as issues related to big data. Therefore, healthcare services (paradigm) are shifting from a centralized, hospital-oriented model toward a distributed patient-centric model.

Rising expectations from healthcare-service providers necessitate improvements in operational efficiency in the healthcare industry and the use of data from various structured and unstructured resources is the key to success. Although a “killer app”
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